

in conjunction with active remedial measures at several other sites. Natural restoration is most valuable when the contaminated aquifer discharges into a surface water body that will not be adversely affected by the contamination.

Pile and Liner Design

The design of the remediated pile and the use of a liner was of concern to several commenters, and recommendations were given for suitable designs. These commenters feared that water would continually infiltrate the remediated piles and contaminate groundwater.

These EPA standards would not be satisfied by designs which allow contamination that would adversely affect human health or the environment. Further, current engineering designs for covers incorporate a number of features that control infiltration to extremely low levels. These may include an erosion barrier (with vegetation, where feasible) to transpire moisture and reduce infiltration; rock filters and drains to drain and laterally disperse any episodic infiltration; very low permeability infiltration barriers to intercept residual infiltration; and finally, the thick radon barrier, which further inhibits infiltration. The combined effect of these features is to reduce the overall hydrological transmission of covers to levels on the order of one part in a billion, with a resulting high probability that there will be no saturated zone of leachate in or below the tailings. EPA expects DOE to use such state-of-the-art designs wherever it is appropriate to do so because of the proximity of groundwater.

Under the provisions of UMTRCA, the detailed design of the pile and its cover is the responsibility of DOE, and confirmation of the viability of the design to satisfy EPA's standards is the responsibility of NRC. EPA's responsibility is to promulgate the standards to which the disposal must conform. It would be inconsistent with the division of responsibilities set forth in UMTRCA to specify actual designs for the piles in these regulations. In this connection, the requirement to provide a liner when tailings are moved to a new location in a wet state is properly seen as a generic management requirement. Any liner for this purpose would only serve a useful purpose for the relatively short time over which the moisture content of the pile adjusts to its long-term equilibrium value, after which the cover design would determine the groundwater protection capability of the disposal.

Restricted List of Constituents

Commenters were overwhelmingly opposed to a restricted list of radioactive or toxic constituents and recommended that the entire list of constituents be relied upon. It is the Agency's experience that, under RCRA, no changes in this list have been requested based on the criteria provided in § 264.93(b). These criteria allow for hazardous constituents to be excluded based on a determination that the constituent does not pose a substantial present or potential hazard to human health or the environment. Therefore, that portion of the RCRA standards which specify conditions for the exclusion of constituents from the RCRA list of hazardous constituents has been excluded as unnecessary.

However, a short list of compounds has been developed by EPA for use in monitoring groundwater under RCRA. This rule incorporates that list of constituents (Appendix IX of part 264) in place of the complete list in Appendix I for the monitoring programs required at §§ 192.02(c)(1), 192.03, and 192.12(c)(1). However, the rule still requires that all hazardous constituents listed in Appendix I be considered when corrective action is necessary.

IV. Summary of the Final Standard

These final standards consist of three parts: a first part governing protection against future groundwater contamination from tailings piles after disposal; a second part that applies to the cleanup of contamination that occurred before disposal of the tailings piles; and a third part that provides guidance on implementation and specifies conditions under which supplemental standards may be applied.

A. The Groundwater Standard for Disposal

The standard for protection of groundwater after disposal (subpart A) is divided into two parts that separately address actions to be carried out during periods of time designated as the disposal and post-disposal periods. The disposal and post-disposal periods are defined in a manner analogous to the closure and post-closure periods, respectively, in RCRA regulations. However, there are some differences regarding their duration and the timing of any corrective actions that may become necessary due to failure of disposal systems to perform as designed. (Because there are no mineral processing activities currently at these inactive sites, standards are not needed for an operational period.) The disposal period, for the purpose of this

regulation, is defined as that period of time beginning on the effective date of the original Title I part 192 standard for the inactive sites (March 7, 1983) and ending with completion of all actions related to disposal except post-disposal monitoring and any corrective actions that might become needed as a result of failure of completed disposal. The post-disposal period begins with completion of disposal actions and ends after an appropriate period for the monitoring of groundwater to confirm the adequacy of the disposal. The groundwater standard governing the actions to be carried out during the disposal period incorporates relevant requirements from subpart F of part 264 of this chapter (§§ 264.92–264.95). The standard for the post-disposal period reflects relevant requirements of § 264.111 of this Chapter. The disposal standard also includes provisions for monitoring and any necessary corrective action during both disposal and post-disposal periods. These provisions are essentially the same as those governing the licensed (Title II) uranium mill tailings sites (40 CFR 192, subparts D and E; see also the **Federal Register** notices for those standards published on April 29, 1983 and on October 7, 1983). Several additional constituents are regulated, however, in these final Title I regulations.

These regulations do not change existing requirements at Title I sites for the period of time disposal must be designed to comply with the standards, and therefore remain identical to the requirements for licensed (Title II) sites in this respect. The Agency also recently promulgated final regulations for spent nuclear fuel, and high level and transuranic radioactive wastes (40 CFR part 191; 58 FR 66398, December 20, 1993). Those standards specify a different design period for compliance (10,000 years versus 1000 years) for two principle reasons: (1) The level of radioactivity, and therefore the level of health risk, in the wastes addressed under 40 CFR part 191 is many orders of magnitude greater than those addressed here. (The radioactivity of tailings is typically 0.4 to 1.0 nCi/g, 40 CFR part 191 wastes are always greater than 100 nCi/g, and are typically far higher.) (2) The volume of uranium mill tailings is far greater than the waste volumes addressed under 40 CFR part 191. The containment that would be required to meet a 10,000 year requirement is simply not feasible for the volumes of tailings involved (the option of underground disposal was addressed and rejected in the original